Distribution, outbreak observations and implications for management of Bluebell Creeper *Billardiera heterophylla* (Lindl.) L.Cayzer & Crisp, in the Green Triangle region of south-eastern Australia

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Abstract
Bluebell Creeper *Billardiera heterophylla* (Lindl.) L.Cayzer & Crisp (syn. *Sollya heterophylla*), is a plant native to south-western Western Australia. Elsewhere in southern Australia, Bluebell Creeper is a highly invasive species and is a serious environmental weed in Victoria, Tasmania and the temperate regions of South Australia. The largest known infestation of the species occurs in the south-east of South Australia; however, this is only one of several recently discovered outbreaks in the vicinity of the state border in the lower south-east of South Australia and far south-western Victoria. The species is considered to be among the top priority environmental weed species for control in the region given what is known of its ecology, in particular its fecundity, capacity for disturbance-induced seed-bank regeneration and wide range of potential dispersal vectors. Bluebell Creeper is associated with a wide range of plant associations and is already well established at several discrete locations in the lower south-east of South Australia and the near-border zone of far south-western Victoria; however, its capacity for further spread is immense unless existing outbreaks are brought under control and simple measures to prevent new incursions are initiated. The known information on the species is collated and observations from a range of infestations with differing management histories, rainfall and edaphic characteristics are summarised. The implications of the species' ecology for best practice management are also discussed, as are future management and research recommendations. (*The Victorian Naturalist* **127** (4) 2010, 137–145)

Keywords: Bluebell Creeper, environmental weed, invasive, management, ecology

Introduction

Bluebell Creeper *Billardiera heterophylla* (Lindl.) L.Cayzer & Crisp, Pittosporaceae is a shrubby climber with twining habit and drooping bell-shaped blue to dark blue flowers with five lanceolate petals up to 10 mm long (Fig. 1). Leaves are narrow-lanceolate, typically glossy green on the upper surface and 16-60 mm long, 2-22 mm wide, acute and glabrous to pubescent. Bluebell Creeper has purplish-green cylindrical berries up to 20 mm long (Fig. 2). Young fruit are densely hirsute, becoming more or less glabrous with maturity (Bennett 1986).

Distribution

Bluebell Creeper (*Billardiera heterophylla*) is endemic to south-western Western Australia. Owing to its invasive potential and popularity as a home garden plant, the species has naturalised in Tasmania, Victoria and the temperate regions of South Australia.

In South Australia, naturalised Bluebell Creeper has been recorded for the Mount Lofty Ranges/Fleurieu Peninsula, Kangaroo Island and south-east regions (DEH 2006a). In Victoria, Bluebell Creeper has been recorded in the greater Melbourne, Eastern, Gippsland, South West and Otways regions (DNRE 2002; Ecology Australia 2006; G. Carr pers. comm.). In the lower south-east of South Australia and adjacent areas of far south-western Victoria, infestations currently are known from 14 discrete locations (Fig. 3).

Ecology

Based on current distribution in the Green Triangle and elsewhere, Bluebell Creeper appears to require annual rainfall exceeding 550 mm (pers. obs.). In south-eastern Australia, Bluebell Creeper appears to prefer lighter (sandy) soils; however, plants will establish in heavier soils provided drainage is good (Muyt 2001). While the majority of soils associated with the species in Western Australia are sandy, soil type is not considered a major factor limiting distribution in its natural range (A Williams pers. comm.). Bluebell Creeper is reported to tolerate at least moderate frost (ASGAP 2006).

In Victoria, Bluebell Creeper is known to invade heathland and heathy woodland, lowland grassland and grassy woodland, and dry sclerophyll forest and woodland (Carr *et al.* 1992). In the south-east of South Australia, Bluebell

Fig. 1. Bell-shaped flowers of Bluebell Creeper *Billardiera heterophylla*

Creeper is associated with the following broad plant communities:

- *Eucalyptus arenacea/E. baxteri* +/- *Pteridium esculentum* woodland;
- *Eucalyptus diversifolia* open mallee;
- *Allocasuarina verticillata* low woodland;
- *Eucalyptus fasciculosa* low woodland;
- *Acacia longifolia* var. *sophorae* +/- *Leucopogon parviflorus* tall shrubland;
- *Melaleuca squarrosa* tall shrubland; and,
- *Eucalyptus ovata*, *E. viminalis* ssp. *cygnetensis* woodland.

Seed often is spread by birds and other animals, or in dumped garden refuse. Dumping may also spread the plant vegetatively. Silvereyes *Zosterops lateralis*, Red Wattlebirds *Anthochaera carunculata*, Singing Honeyeaters *Lichenostomus virescens* and Spiny-cheeked Honeyeaters *Acanthagenys rufogularis* are known to take fruits of *Billardiera* spp. (Forde 1986). Seed of Bluebell Creeper also has been recorded from the scats of Kangaroos *Macropus* spp., Brushtail Possum *Trichosorus vulpecula* and Fox *Vulpes vulpes* (A Williams pers. comm.). Other suspected vectors include large scincoid lizards *Tiliqua* spp., Southern Brown Bandicoots *Isoodon obesulus* and Swamp Rats *Rattus lutreolus* (A Williams pers. comm.; pers. obs.).

Fig. 2. Cylindrical berries of Bluebell Creeper *Billardiera heterophylla*

In Western Australia, seeds of the closely related *Billardiera fusiformis* are known to be dispersed by the following small mammals: Bush Rats *Rattus fuscipes*, Gilbert's Potoroos *Potorous gilbertii* and Quokkas *Setonix brachyurus* (Cochrane *et al.* 2006). Cochrane *et al.* (2006) also found that ingestion by mammals assisted in germination of fresh seeds, and germination was greater and more rapid in seeds collected from scats than in freshly collected seed. Given the similarity of the species concerned, it is worth considering whether analogous mechanisms may be at play with Bluebell Creeper, and certainly supports the notion that small mammals are likely to be an important seed-dispersal vector for the species.

In Victorian coastal woodlands, thousands of seedlings of Bluebell Creeper emerge following fires or soil disturbance amongst dense infestations of the species (Muyt 2001). This response has been observed in Rennick State Forest in south-western Victoria following fire, as shown in Fig. 4 (pers. obs.). The same fire response in Bluebell Creeper also has been observed in Western Australia (A Williams pers. comm.), where it has been observed in the closely related *Billardiera fusiformis* (Cochrane *et al.* 2006). Seed trials for this species demonstrated that *B. fusiformis* germination was significantly enhanced by smoke treatment (to simulate fire) and aging. In untreated seed fresh from the plant 0% germination was obtained, whereas around 90% germination was obtained from seed that was aged for over 15 months and smoke treated (Cochrane *et al.* 2006).

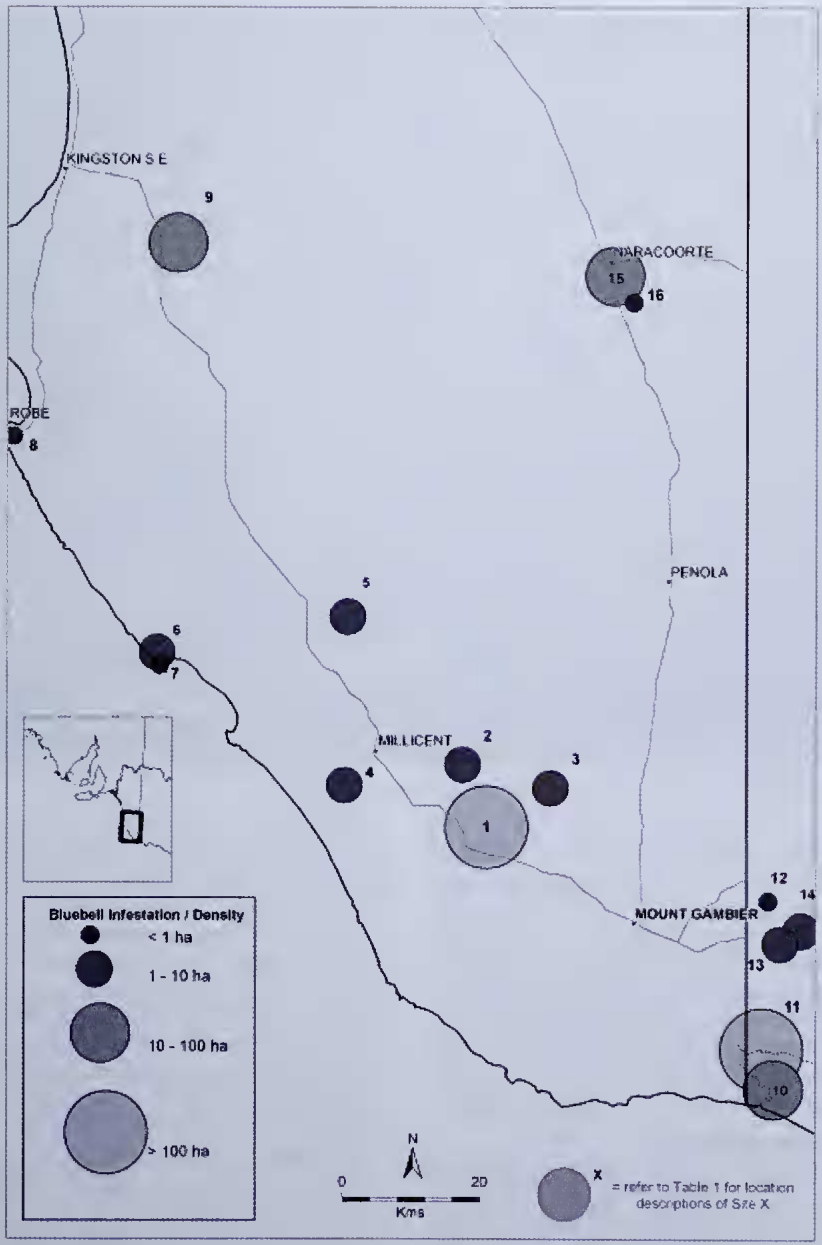

Fig. 3 *Billardiera heterophylla* distribution in the Green Triangle region.
1. Tantanoola Forest – Mile Hill Road area (SA). 2. Mt Burr Range – Burr Slopes South Native Forest Reserve (SA). 3. Glencoe area – Kalangadoo Road Reserve (SA). 4. Canunda Frontage Road Reserve – west of Millicent (SA). 5. Gillap South and Kennion Native Forest Reserves (SA). 6. Wooley Lake, Beachport Conservation Park (SA). 7. Beachport (SA). 8. Cullen Reserve, Robe (SA). 9. Reedy Creek (SA). 10. Nelson (Vic). 11. Princess Margaret Rose Cave, Lower Glenelg National Park (Vic). 12. Rennick State Forest, northern end (Vic). 13. Rennick State Forest, Princes Highway site (Vic). 14. Private property adjacent to eastern boundary of Rennick State Forest (Vic). 15. Naracoorte South Parklands (SA). 16. Cave Range, near Naracoorte (SA).

Fig. 4. Regeneration of Bluebell Creeper *Billardiera heterophylla* after fire

Mature plants of Bluebell Creeper are able to regenerate rapidly from basal stems following a spring fire as observed at Glencoe Hill Native Forest Reserve, SA, 2006; however, it is unclear whether mature plants are capable of regenerating consistently from basal stems following summer or autumn fires, and this requires further investigation. Initial observations at the Rennick State Forest site, previously referred to, appear to indicate a high level of adult mortality from higher intensity fire during autumn.

Status and availability

Bluebell Creeper remains a highly popular home garden plant and has been commercially available in Australia and internationally for at least a hundred years. For example, *Sollya (Billardiera) heterophylla* was available for sale in Cinchona, Jamaica, as early as 1887 (Jamaica Bulletin 1892 cited in Goodland and Healey 1996). A recent survey of nurseries and plant suppliers in the South East of South Australia found that Bluebell Creeper was being sold at nine out of 24 suppliers surveyed (DEH 2006b).

Bluebell Creeper is not proclaimed under the South Australian *Natural Resource Management Act 2004*. Likewise, the species is not proclaimed under any of the four categories in the Victorian *Catchment and Land Protection Act 1994*. As such, Bluebell Creeper is not prohibited from sale and continues to be freely available in both South Australia and Victoria. Despite this lack of formal recognition, a recent weed risk assessment process for the South East of South Australia determined Bluebell Creeper as among the highest weed risks for both the environment and the plantation forestry industry (Anderson *et al.* 2005). More recently, a hybrid form of Bluebell Creeper (*Sollya heterophylla x parviflora*) has been developed, and is known as Edna Walling Blue Bells. It has been bred to keep the original qualities of the parent stock, but it is claimed to be a sterile hybrid selection to avoid the environmental weed impacts associated with one of its parents, *Billardiera heterophylla* (Australflora 2010).

Outbreak Observations

Characteristics observed at the outbreaks in this region appear to display an interesting in-

teraction between time, management history and habitat. As a result of these factors, there do appear to be some broadly consistent outbreak 'types' that are suggested and described in more detail below; however, it is important to note that it is possible to have two outbreak 'types' within one infestation if they have not been subjected to uniform management. This occurs typically where an infestation crosses forestry compartments or land tenure boundaries.

1. Mature and apparently 'stable' – 'sleeper outbreaks'

Sleeper outbreaks occur at sites where Bluebell Creeper obviously has been present at the site for many years, but where there is no evidence of a significant disturbance event (e.g. fire) during most of the time that the species has been present. In these conditions, Bluebell Creeper appears somewhat 'stable', with large to medium sized bushy or climbing shrubs scattered across the site at a relatively low density. These mature bushes are capable of producing massive quantities of seed that, for the most part, appear to lie dormant, hence the term 'sleeper outbreak'. This seed naturally accumulates in higher quantities beneath the leaf fall zone of each bush; however, a significant number of seeds also are being transported more widely after faunal species (birds and mammals) have eaten, digested and expelled the fruits and seed. These digested (i.e. 'treated') seeds may then have a greater probability of germination in the absence of disturbance than the seed that simply falls from the bush (Cochrane *et al.* 2006).

The best examples of this outbreak type are in the Naracoorte South Parklands, some native vegetation compartments within the Tantanoola Forest — Mile Hill Road area, and remnant vegetation of Lower Glenelg National Park within the vicinity of the Princess Margaret Rose Cave. At the latter site, the last wildfire passed through in 1979, but the current pattern of invasion in native vegetation is that of a sleeper outbreak. Given the long history of garden style plantings in the vicinity of the cave, it is highly likely that the species was present prior to the fire, but may have been in an early stage of invasion — prior to the establishment of a more substantial seed bank. Hence, in each of these cases, it is likely that Bluebell Creeper has been present for decades. Significantly, these sites illustrate that given enough time and with a large enough number of mature reproductive individuals in a population, the background level of recruitment (in the absence of a high-level disturbance event) is still enough eventually to result in a low density pattern of invasion across relatively large areas of native vegetation, or indeed neighbouring plantation forest. As a result of these characteristics, remnant native vegetation can **appear** to retain its overall structural integrity and species diversity in the presence of Bluebell Creeper; however, the fecundity of the species means that, in the case of sleeper outbreaks, the live specimens represent only the 'tip of the iceberg' in terms of Bluebell Creeper density and extent should the potential of the seedbank be realised.

2. Mature and aggressive – 'active outbreaks'

Active outbreaks are where the potential of the Bluebell Creeper seedbank at a long-established infestation has been manifested. In the most seriously affected sites in this category, Bluebell Creeper can reach >80% projected cover in the understorey; e.g. Windy Hill Native Forest Reserve, south-east SA (see figure on p. 136). At such sites, Bluebell Creeper appears to impact severely on the structural integrity and richness of the understorey in otherwise intact remnants of native vegetation. Hence, it appears that a single disturbance event such as fire, has the immediate potential to turn a sleeper outbreak into an active outbreak. A recent example of this has occurred at the Rennick State Forest–Princes Highway site, where a prescribed burn in Autumn 2003 resulted in the mass germination of tens of thousands of Bluebell Creeper seedlings over approximately 10 ha of remnant vegetation. Although the exact nature of the species at the site was not documented prior to the burn to enable a direct comparison, it is interesting to note that the pattern of infestation in an adjacent unburned compartment showed the typical characteristics of a sleeper outbreak, as previously described, with a handful of mature, heavily fruiting individuals and little or no apparent seedling recruitment. In support of this recent observation is the fact that the most heavily infested remnant vegetation compartments in the Tantanoola Forest–Mile Hill Road area, have a prescribed burning fire management history that accounts for, and closely corresponds with, their highly infested condition.

The other means by which sleeper outbreaks appear to be 'activated', although perhaps not to the same extent as with fire, is through the soil

disturbance and additional light penetration associated with plantation forestry operations. It appears that *Pinus radiata* plantation, adjacent to Lower Glenelg National Park at Princess Margaret Rose Cave, while being harvested and prepared for replanting, inadvertently stimulated the seed bank of Bluebell Creeper. At this site, a high density of plants borders the edges of tracks through the replanted pines, progressively becoming less common with distance from the Cave area; however, scattered plants were still found over 2 km away. Mechanical disturbance also appears to have contributed to mass germination of the species at Eagle Quarry in the Mt Lofty Ranges (SA), a site outside the region, resulting from site rehabilitation works (in combination with the presumed use of fill contaminated with Bluebell Creeper seed) (pers. obs.).

Through the dramatic increase in the number of individual plants in a population in a relatively short period of time after disturbance, active outbreaks very quickly are able to reach a point where the scale of the infestation has the capacity to escalate exponentially. Once the recruited individuals become reproductive and capable of contributing to a new seed bank, which can take as little as three years, this alarming process is underway.

3. Early Point Source – 'Emerging Outbreaks'

Emerging outbreaks are either one or a handful of individual plants occurring at a site that is geographically isolated from other known infestations. An emerging outbreak is essentially a very early sleeper outbreak, but different in that it consists of so few individuals that they have not yet been established long enough to have created a seed bank capable of the scale of response observed in triggering active outbreaks.

All known infestations must have started from a single point source, at which time they would have fitted this definition of an emerging outbreak. Left untreated in the right habitat, soil type and rainfall zone, an emerging outbreak will become a sleeper or active outbreak at some future point. Falling into this category are the outbreaks at Cave Range near Naracoorte, consisting of a handful of scattered medium sized plants, and a single medium sized bush found on the northern boundary of Rennick State Forest. In each case, apparently suitable habitat occurs in the vicinity, and other more severe outbreaks occur within 10 km, indicating that, left untreated, in time the scale of the problem would more than likely escalate.

It is also important to consider that there may be habitats that are less suitable for the species, where Bluebell Creeper may not establish and spread as readily. Possibly fitting this category, the site at Beachport is unusual in that it is the only known outbreak in a highly exposed coastal dune environment. This site consists of only a handful of individuals and, interestingly, this appears to be the only location where the white-flowered form of Bluebell Creeper has naturalised in the region. Cullen Reserve, at Robe, is another example where a handful of plants have been identified in a patch of remnant coastal native vegetation immediately inland of the dune environment.

It is important to note, however, that irrespective of their location and habitat type, all emerging outbreaks should be treated with equal priority for eradication, given the minimal resources required for control at this early stage, and the scale (**and future cost**) of the problem potentially being prevented.

Likely Outbreak Sources

Given that outbreaks usually begin from a single point source, it is important to consider the means by which this is likely to have occurred in the past. The importance of these observations for improving understanding of how to best prevent new outbreaks from occurring in the future cannot be underestimated.

After being sold to the public in nurseries, it appears there are two likely primary means by which Bluebell Creeper has, and can continue to become, established in native vegetation.

(a) Deliberate planting in proximity to native vegetation

1. Princess Margaret Rose Cave: There is evidence from other plantings at the caves to suggest that Bluebell Creeper was deliberately planted many years ago in the gardens and/or bush in the immediate vicinity of the cave, which has been open to the public since the 1930s.
2. Nelson: Bluebell Creeper has been seen growing in gardens within the township of Nelson, and is now found in bushland within and adjacent to the town, including Lower Glenelg National Park and Nelson State Forest.
3. Naracoorte: Bluebell Creeper was identified growing in a works depot adjacent to the Parkland. There are also several other houses and properties that back onto this reserve.

(b) Dumping garden waste – legal and illegal

1. Rennick State Forest – Highway site: Both sides of one of the tracks at this site is littered with a significant amount of hard rubbish and several species of typical garden weeds that are found in dumped garden waste in bushland, confirming its history of abuse and the likely source of the introduction of Bluebell Creeper.
2. Private property adjacent to Rennick State Forest: This property shows signs of past private hard rubbish dumping, and the owner has confirmed that it is quite likely that garden waste also may have been dumped previously at the site.
3. Nelson: The town rubbish dump still operates on the doorstep of Lower Glenelg National Park, and is surrounded by bushland. Many species of weeds can be seen proliferating at the site from previously dumped garden waste, and it is probable that this site may have contributed to the outbreak at the town.
4. Tantanoola Forest–Mile Hill Road area: The old Glencoe dump site on Mile Hill Road is the most likely point source of this infestation, which at over 1000 hectares, is the largest known outbreak of Bluebell Creeper in south-eastern Australia.

An additional secondary form of spread that potentially could result in new outbreaks is now also possible given the establishment of a handful of large naturalised populations of the species in the region.

(c) Machinery or vehicle spread

Burr Slopes South Native Forest Reserve: This outlier outbreak is most likely explained by a chance dispersal to the reserve of Bluebell Creeper on heavy machinery (e.g. grader or slasher) used in infested forest in the main Tantanoola Forest outbreak several kilometres further to the south.

In addition to these potential causes of past and future outbreaks, the expansion of existing outbreaks is facilitated by means of biological vectors, such as birds and mammals. It is assumed that the majority of such dispersal events will occur within close proximity to the source material; however, the possibility of chance long-distance biological dispersal events cannot be ruled out and may warrant further investigation.

Management Implications and Recommendations

1. Mature and apparently 'stable' – 'sleeper outbreaks'

Sleeper outbreaks, particularly those that are relatively restricted in size, provide land managers with a unique opportunity for the physical removal of the extremely fecund (and often highly visible) mature individuals from the site without the fear of an uncontrollable seed bank response. These mature individuals may be either sprayed with glyphosate and a penetrant, or cut at the base and the stump swabbed with herbicide, while any seedlings can be hand-pulled. If completed successfully, no new seed will then be contributed to the seed bank, and the residual rate of germination in the absence of disturbance can be managed with lower intensity human resources over several years, to prevent any seedlings from reaching reproductive age. As our knowledge of seed bank ecology for the species improves, additional management options may also emerge, as will a more detailed understanding of how long ongoing management of the site may be required to achieve eradication.

Fire as a management tool at sleeper outbreaks should be actively discouraged in light of current observations and the present understanding of the species' ecology, as it is clearly fire responsive. In all but the smallest sleeper outbreaks, fire has the potential to escalate the labour requirements quickly post-fire beyond the capacity of the land manager. In such a case, where the appropriate resources are not deployed post-fire, the outbreak population will have significantly increased in numbers, and hence is likely to become more active and aggressive within a matter of years. With our current knowledge, the use of fire is, therefore, a management risk not worth taking unless fully prepared for the potential consequences.

2. Mature and aggressive – 'active outbreaks'

Management style of an active outbreak depends on scale. For a relatively small active outbreak (such as at Rennick State Forest–Princes Highway site), there may be an opportunity to remove any remaining mature plants and commence intensive management before the new generation of fire respondent recruits is reproductive. In this case, physical management of plants through hand-pulling, or herbicide spraying with a backpack may be feasible for very dense areas of seedlings.

For active outbreaks that are beyond these 'site scale' control measures, such as where the outbreak overlaps compartment boundaries or property tenures, the development of a plan initially to contain and prevent further spread of the outbreak is recommended. The emphasis for managers of sleeper and active outbreaks should be to ensure that on-ground actions are aimed at doing everything possible to prevent the outbreak from reaching a scale where containment becomes the only short-term feasible management option.

3. Early point source – 'emerging outbreaks'

Emerging outbreaks provide the best opportunity to activate targeted management to eradicate Bluebell Creeper from a site, with low level but sustained resources and vigilance, preventing the species from realising its potential; however, emerging outbreaks made up of few individuals are by their nature initially very difficult to detect. Land managers need to be vigilant in ensuring that staff and volunteers are aware of, and readily able to identify, this weed to ensure that emerging outbreaks can be identified promptly and given the highest priority in work programs for immediate control.

Pre-emptive measures

In addition to planning for dealing with known or anticipated new outbreaks of Bluebell Creeper, preventative steps also can be taken to reduce the risk of new incursions ever becoming established in the first place. For example:

a. **Prevention of sale in nurseries** – the simplest way to reduce the risk of new outbreaks in unexpected localities is to prohibit the sale of high risk species in nurseries. Government authorities responsible for weed management in many states, including South Australia and Victoria, need to be more proactive in this most basic but essential preventative measure. Importantly, this approach is consistent with the key recommendations of the Senate enquiry into invasive species (C of A 2004).

b. **Closing of unmanaged rubbish dumps** – particularly those in the immediate vicinity of remnant native vegetation, as many in the region tend to be. The dump at Nelson in Victoria, or Canunda in South Australia, provide standout examples where two highly incompatible land uses lie adjacent to one another, when these dumps are located on the boundaries of iconic National Parks.

c. **Machinery/Vehicle Hygiene** – particularly machinery such as slashers or graders that actively disturb the soil or vegetation, should be thoroughly washed down before leaving an area known to be infested with Bluebell Creeper.

These three simple preventative measures would dramatically reduce the risk of new incursions of Bluebell Creeper, as well as many other environmentally serious garden escapes, and allow for management efforts to be focused on the early detection and management of sites where the species can readily be brought under control.

Summary of Management Recommendations:

1. Do not burn a bluebell creeper infestation unless scale is very small and be prepared for high cost consequences;
2. Vigilance in early detection of emerging or sleeper outbreaks in south-eastern Australia is critical to preventing a broader scale impact by this species;
3. Immediate action is required to treat emerging outbreaks, due to the feasibility of eradication and the ability to prevent escalation in the scale of the outbreak;
4. Prevention is the first, most basic step required in planning the control of emerging weeds, hence the following examples of preventative actions are essential:
   a. Prohibition from sale in nurseries;
   b. Closing rubbish dumps located in sensitive bushland areas;
   c. Better machinery hygiene.

Research Recommendations

In addition to utilising the most recent scientific and anecdotal/observational information in managing Bluebell Creeper, such as is outlined in this paper, land managers will require additional help in developing future management strategies. This is particularly relevant to those responsible for managing the largest scale of active and sleeper outbreaks where manual control is now out of the question. Some key research questions that have emerged during the course of the authors' investigation into the ecology of Bluebell Creeper outbreaks include:

1. Seed viability through time

At sleeper sites where it is possible to eradicate the reproductive generation of plants manually, it is essential to know what the rate of seed

bank deterioration is. In this way, managers could make an informed decision about issues such as:

- the number of years that ongoing manual removal of seedlings is required, and hence the ongoing work programming and resource implications of managing outbreaks;
- whether there are a critical number of years after the removal of reproductive plants when fire exclusion is essential but, after which, the viability of persisting seed drops below a threshold so that, potentially, fire can be used as a part of an eradication strategy – without the prohibitively high cost caused by burning earlier, and;
- the formulation of a realistic target for true (i.e. seed bank) eradication of the species from a site.

2. Fire and season

It is likely that in spite of the recommendations in the paper, fire will continue to interact with Bluebell Creeper populations. While the occurrence of wildfire is unpredictable, it is important from a management point of view that its effect on Bluebell Creeper outbreaks be anticipated and planned for. In this way, any prescribed burns that are planned for areas of known infestation must be capitalised upon in terms of the opportunity they provide to better understand the interaction between fire and the species, and allow for comparison of different fire treatments, such as intensity and season.

3. Biological control

As a Western Australian endemic species restricted to the south-west of that state, Bluebell Creeper is potentially subject to, and limited by, biological agents (e.g. insects, pathogens) not present across the Nullarbor in the naturalised weedy populations of south-eastern Australia. Early work (R Adair and A Williams pers. comm.) indicates that there are some insect species worth further investigation, although the process (if started) will be necessarily slow, hence this is a longer term option and strategy. This is because in addition to the work required to assess suitability of potential control on Bluebell Creeper, any insects identified also would have to be tested thoroughly to ensure that they pose no risk to any closely related indigenous species such as Native Apple-berries (*Billardiera* spp.).

It should be noted that before work on biological control agents is likely to receive government grant funding, governments of south-eastern Australia would need to have proclaimed Bluebell Creeper as a weed species under each state's relevant legislation.

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